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EXAMINER
BRUTUS, JOEL F

ART UNIT	PAPER NUMBER
3768	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/678,504	OKAMURA ET AL.	
	Examiner	Art Unit	
	JOEL F. BRUTUS	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5, 7-9, 11-14, 20-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chopp et al (US Pat: 5,305,751) in view of Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) and further in view of Barnes (US Pat: 4,843,504).

Regarding claims 1-5, 7-9, 11-14, 20-26, Chopp et al teaches a method of measuring liquid flow in a living organism by applying magnetic field. The measurement of the induced magnetic field is accomplished using at least two magnetic sensors [see column 2 lines 20-35]; applying an applied magnetic field to a living organism, introducing a time varying quantity of a magnetizable fluid into a flow of liquid in the living organism, and measuring the variation in an induced magnetic field [see abstract]; The measurement of the induced magnetic field is accomplished with at least two magnetic field sensors [see abstract]. Chopp et al further teaches the magnetic field is applied to the body by a magnet that could be an electromagnet that produces either a constant applied magnetic field or a time varying applied magnetic field [see column 3

lines 3-7], a biomagnetometer that has a plurality of magnetic sensors and each sensor includes a pick up coil [see column 4 lines 9-13]. Chopp also teaches the magnet, sensors and Squid are placed in a magnetically shielded room [see column 5 lines 1-7] and the sensors and SQUID are inside in an insulated enclosure [see column 4 lines 35-55].

Chopp et al doesn't teach a preamplifier, AC current to drive electromagnet.

However, Tanaka et al teaches magnetometer to detect sentinel lymph nodes [see page 665], measuring magnetic field associated with the fluid [see page 666 and bottom of fig 3], a sinusoidal AC current, a lock amplifier that consists of a phase sensitive detector, a low pass filter and a phase shifter [see page 666]. Tanaka et al further teaches demodulating signals by the lock in amplifier [see page 666].

Chopp et al doesn't teach a modulating unit for vibration or rotation.

However, Barnes et al teaches a preamplifier [see column 8 lines 15-16, an actuator coil [see column 2 lines 64-66], a magnetic shielding means [see column 9 lines 19-23], electromagnet and magnet are oriented in direction of movement [see column 8 lines 52-54] and fig (8), thin film [see column 5 lines 41-43], a differential amplifier [see column 7 lines 35-37], ferrite core [see column 5 lines 6-8], drive circuitry [see column 8 lines 10-12 and column 4 line 37], rotary drive [column 2 lines 65-66]. The rotary drive and the actuator coil would rotate and/or vibrate any of the magnet, electromagnet, and sensor (1). U shaped or horseshoe magnets and electromagnets [see column 1 lines 30-35] and fig (8).

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to combine these references; for the purpose of obtaining higher resolution, provide accurate images having a good signal to noise ratio. One with ordinary skill in the art at the time the invention was made would be motivated to use magnetic sensors for the very low noise advantage. The phase shifter of Tanaka et al can be used as a variable offset to regulate signal acquisition. to have a more compact configuration that would pick up stronger signal, therefore increasing resolution with a higher SNR by minimizing artifacts. U shaped magnets to conserve magnetic flux emanating therefrom.

One would be motivated to use thin film technologies for reducing the cost. The rationale for this is that thin-film modules are expected to be cheaper to manufacture owing to their reduced material costs, energy costs, handling costs and capital costs; and using ferrite because of low cost and relatively high output. One with ordinary skill in the art would be motivated to use the magnets symmetrically to strengthen signal processing.

3. Claims 6, 10, 17, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable Chopp et al (US Pat: 5,305,751) in view of Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) and further in view of Barnes (US Pat: 4,843,504) as applied to claims 1 and 2 above, and further in view of Yarnall et al (US Pat: 6,331,703).

Regarding claims 6, 10, 17, 18 and 19, all other limitations are taught as set forth by the above combination.

The above combination doesn't teach airtight and watertight probe or configuration and a magnetic shielded preamplifier.

However, Yarnall et al teaches a targeting probe made of non magnetic material that has housing with a preamplifier [see column 6 lines 30-52 and fig (7)]. Yarnall et al further teaches that the probe is sealed [see column 6 lines 47-50] and airtight [see column 6 lines 47-50].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use the Yarrnall et al teachings for the purpose of preventing body fluid from contacting inside the probe and to avoid damaging electronic circuitry while producing high magnetic field levels. One with ordinary skill in the art would motivate to magnetically shield the preamplifier and the driver circuit to cancel out some of the excess magnetic field.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable Chopp et al (US Pat: 5,305,751) in view of Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) and further in view of Barnes (US Pat: 4,843,504).as applied to claims 1,2, 4 and 8 above, and further in view of Kryder et al (US Pat: 4,800,457).

Regarding claims 15 and 16, all other limitations are taught as set forth by the above combination.

The above combination t teaches neither magnetic impedance (MI) sensor nor magnetic resistance (MR) sensor.

However, Kryder et al teaches magnetic resistance sensor [see column 5 lines 57-59].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use magnetic resistance sensor for the purpose of regulating the level of magnetization.

5. Claims 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chopp et al (US Pat: 5,305,751) in view of Tanaka et al (Application of High Tc Squid Magnetometer for Sentinel Lymph Node Biopsy, IEEE Transactions on applied Superconductivity, Vol. 11, No. 1, P. 665-668, March 2001) and further in view of Barnes (US Pat: 4,843,504) as applied to claims 1, 2,24, 23 and 21 above, and further in view of Nakamura et al (US Pat: 5,559,340).

Regarding claims 22 and 27, all other limitations are taught as set forth by the above combination.

The above combination doesn't a CDS photocoupler.

However, Nakamura et al teaches CDS photocoupler [see column 1 lines 60-62].

Therefore, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use CDS photocoupler; for the purpose of transmitting

signal optically between two circuits.

Response to Amendment

6. The amendment filed on 11/14/2008 under 37 CFR 1.131 has been considered but is ineffective to overcome the above rejections.

Response to Arguments

7. Applicant's arguments filed on 11/14/2008 have been fully considered but they are not persuasive.

Applicants argue that the combination Tanaka et al, Chopper et al, Barnes and Yarnall doesn't teach a modulating unit for modulating magnetic distribution by vibrating or rotating any of the magnet, the combination of the magnet and the plurality of sensors, and preamplifier. Examiner disagrees, Barnes et al teaches an actuator coil and rotary drive [column 2 lines 65-66]. The rotary drive and the actuator coil would rotate and/or vibrate any of the magnet, electromagnet, and sensor (1) for the same reason as set forth above.

Applicants also argue that none of the reference teaches MR sensor. However, Kryder et al teaches magnetic resistance sensor [see column 5 lines 57-59].

Applicants argue that the use of SQUID element in the body would have a detrimental affect on the body.

Chopper et al teaches the use of SQUID detectors outside of the body [see column 5 lines 3-10].

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./
Examiner, Art Unit 3768

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768